Space Weather Forecast

Issued on Sunday, 10 July 2022 at 13:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Daily Chance of a Moderate-class X-ray flares and R1/R2 Radio Blackouts. One CME pending analysis.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is low, with a few common-class flares recorded, peaking with an upper-end common-class flare at 09/1348UTC. This emanated from a decayed remnant of a small bipolar sunspot group on the southwestern solar horizon. This was associated with a large non-Earth directed Coronal Mass Ejection (CME). Also of note was an impulsive middling common class flare at 09/2103UTC, with this emanating from the trailing portion of previously quiet sunspot group in the northwest. Finally, a third event in the form of a long-period common-class flare was observed at 09/2245UTC from immediately east of a small sunspot near the middle of the Sun's facing side. There is some evidence of a CME having been generated from this event. Imagery is limited to corroborate this, however being near the solar meridian, an Earth-directed component is probable.
There are six sunspot regions on the Sun in total, with the two largest and most complex both occupying the eastern solar hemisphere. The larger and historically more active of the two showed proliferation in its intermediate spots and some spreading.

Solar Wind / Geomagnetic Activity: The solar wind generally followed a slow regime and showed little change. The number of particles comprising the solar wind was mainly within usual background levels, peaking at the very start of period. The magnetic field associated with these particles rose late in the period from Weak to Moderate by 10/0900UTC and the important northwards/southwards field was similar. The net result of the above solar wind measures was quiet to unsettled geomagnetic activity over the 24 hours, with an increase at the end of the period.

Energetic Particles / Solar Radiation: Solar radiation showed a response in the lower end of the spectrum in the wake of the common class flare from the better-connecting (with Earth) western solar horizon.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is low with a daily chance of moderate-class flares. A progressive slight increase is possible in the four days, with the sunspots that present the greatest risk of flares still in the eastern solar hemisphere (therefore far from departing over the western horizon), possibly bolstered by further arrivals over the northeastern horizon into the new working week UTC.

Solar Wind / Geomagnetic Activity: There may be a glancing blow from a CME on day 2 (11 July) but confidence i currently low for this evening. Solar winds starting Slow before a fast wind may present at Earth from Monday 11 July, albeit with low confidence for bearing little resemblance to last rotation and possessing a very fragmented leading edge (complicating

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forecasting the arrival time). All considered, there is a slight chance of a G1/Minor Storm at this time, reducing to more reliably quiet levels once again towards midweek.

Energetic Particles / Solar Radiation: In the absence of any significant sunspot development, there is a daily slight chance of S1 or greater, with risks from the southwest solar horizon feature bolstered by the westward progression of the front-sided large sunspot groups.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	20	10	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	40	40
Very Active	R3 to R5 X	No	15	15	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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